



Prevalence and Relative Risk of Drunk and Drugged Driving

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$$P(i|V) = \frac{\partial \ln G(e^V)}{\partial V_i} \int_a^b \varepsilon \Theta + \Omega \int \delta e^{i\pi} = \{2.7182818284 \dots\}$$

DTU Transport
Department of Transport

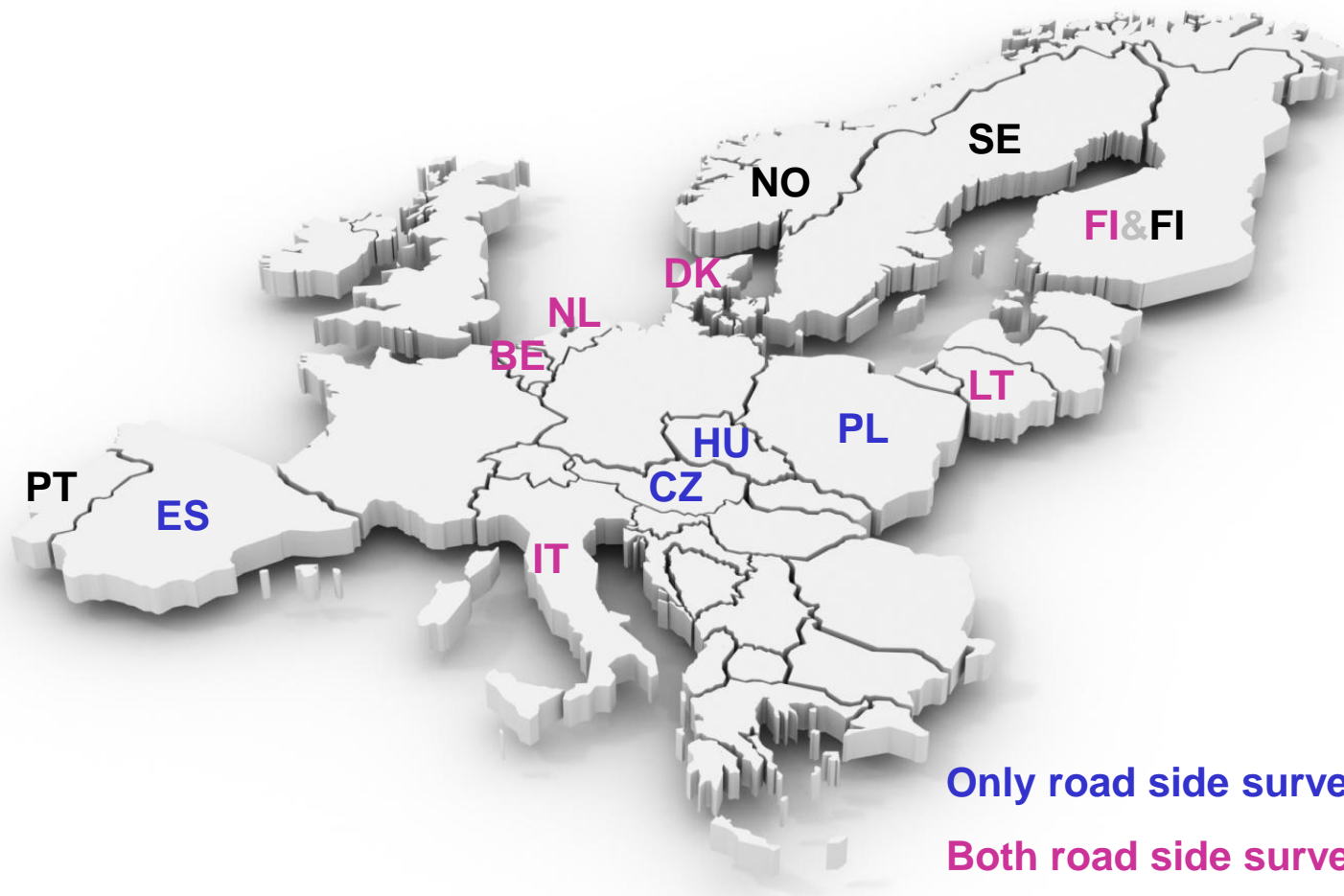


- **Objectives:**
 - **To assess the situation in Europe regarding the problem of alcohol and/or other psychoactive substances in relation to road safety**
 - **Prevalence in the driving population**
 - **Prevalence in seriously injured drivers**
 - **Prevalence in killed drivers**
 - **Risk of injury for drink and/or drug drivers**



Foto: DTF/Michael Medgyesi

Participating countries



Only road side survey

Both road side survey and injured drivers

Both road side survey and killed drivers



Session 647, TRB 2012, Washington, 24 January 2012



Psychoactive substances in question



10 substance groups were formed, based on alcohol and 24 illicit and medicinal drugs

- Alcohol
- Illicit drugs
 - Amphetamines, including methamphetamines and MDA, MDEA and MDMA
 - Cocaine and benzoylecgonine
 - Cannabis
 - Illicit opiates
- Medicinal drugs
 - Benzodiazepines
 - Z-drugs
 - Medicinal opioids
- Alcohol in combination with other drugs
- Multiple drugs



Positive concentrations were based on the same cut-offs in all studies

Equivalent cut-offs



Substance	Recommended equivalent cut-off in whole blood (ng/mL)	Recommended equivalent cut-off in oral fluid (ng/mL)
Ethanol	0.1 (g/L)	0.082 (g/L)
6-AM	10	16 ¹
Alprazolam	10	3.5
Amphetamine	20	360
Benzoylcegonine	50	95
Clonazepam	10	1.7
Cocaine	10	170
Codeine	10	94
Diazepam	140	5.0 ²
Flunitrazepam	5.3 ¹	1.0 ²
Lorazepam	10	1.1
MDA	20	220 ¹
MDEA	20	270 ³
MDMA	20	270 ¹
Methadone	10	22
Methamphetamine	20	410
Morphine	10	95
Nordiazepam	20	1.1
Oxazepam	50	13
THC	1.0	27
Zolpidem	37	10 ²
Zopiclone	10	25 ¹
Tramadol	50	480
7-amino-clonazepam	1.0	3.1 ¹
7-amino-flunitrazepam	8.5 ¹	1.0 ²

Body fluid collected:

1. Saliva
2. Blood
3. Both



Prevalence in the driving population



- **Alcohol and other psychoactive substances in drivers in the general traffic**

Method:

Roadside surveys in 13 countries by means of a uniform protocol in all countries

Blood and/or saliva collected

In total app. 50,000 drivers of passenger cars and vans

Participating countries

BE, CZ, DK, ES, FI, HU, IT, LT, NL, NO, PL, PT and SE

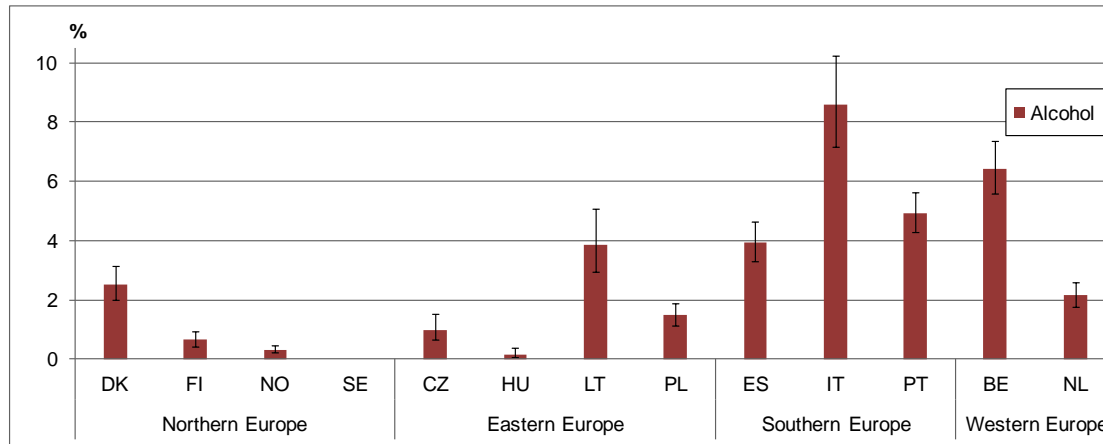
Samples weighted by traffic in 8 periods of the week



Prevalence in the driving population

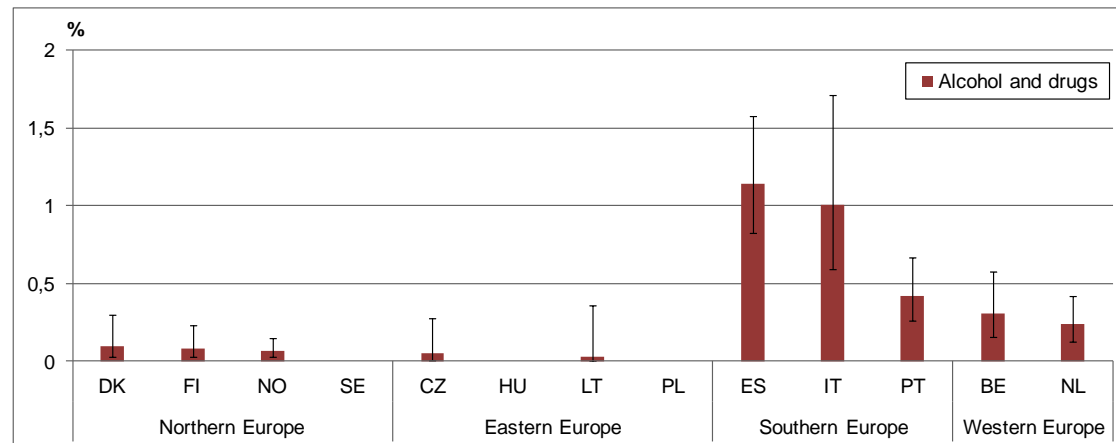


Alcohol



Prevalence of alcohol

Prevalence of alcohol in combination with other drugs



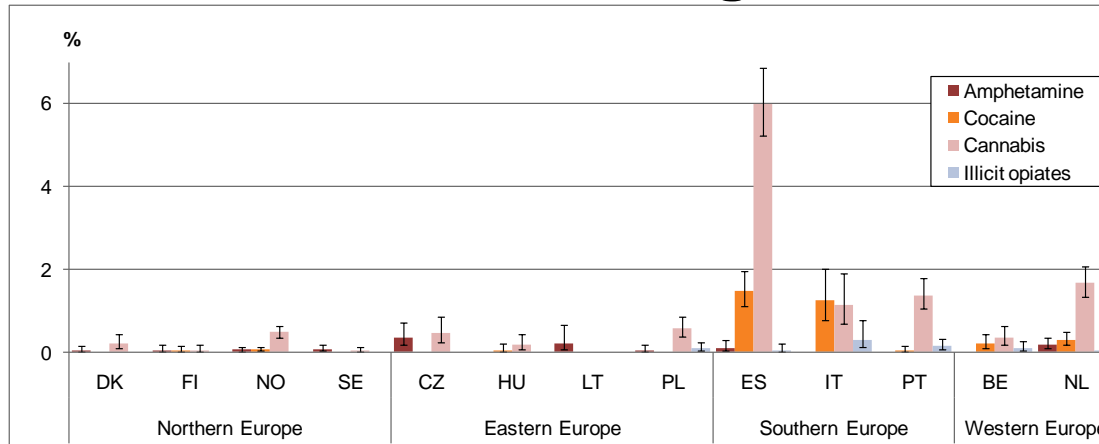
Alcohol is still the most prevalent substance in the driving population
- but most of the drink driving was with concentrations below 0.5 g/L



Prevalence in the driving population

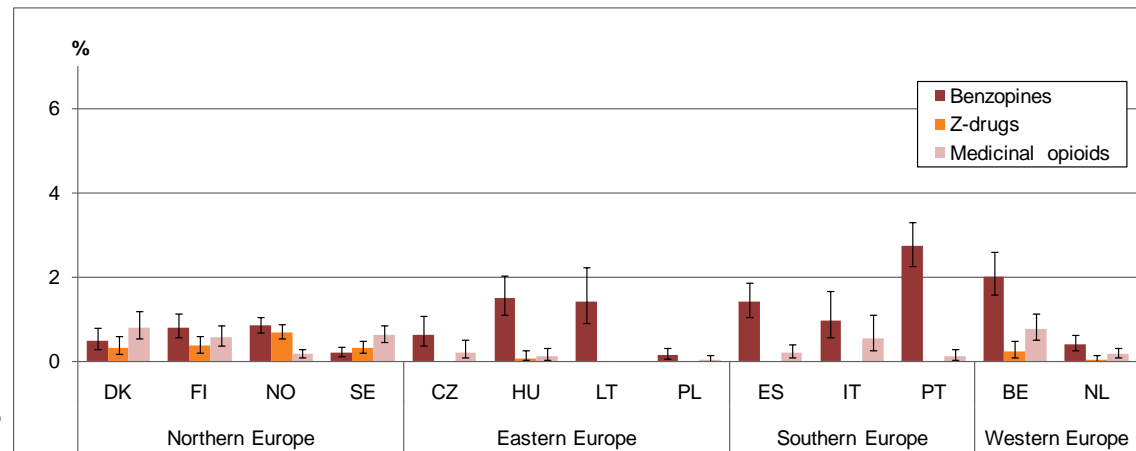


Illicit and medicinal drugs



Prevalence of illicit drugs

Prevalence of medicinal drugs



Illicit drugs are most prevalent in southern and western Europe

Driving with medicinal drugs was observed all over Europe



Prevalence in injured and killed drivers



- **Alcohol and other drugs in seriously injured and killed drivers**

Method:

Study of seriously injured drivers in 6 countries and study of killed drivers in 4 countries, by means of a uniform protocol for all countries

Blood was collected

In total

- App. 2,600 seriously injured drivers
- App. 1,000 killed drivers of passenger cars and vans

Participating countries

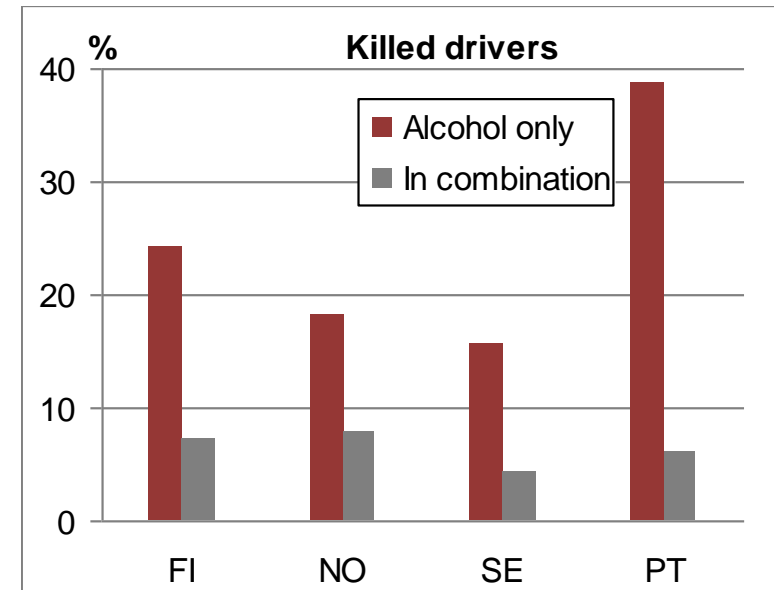
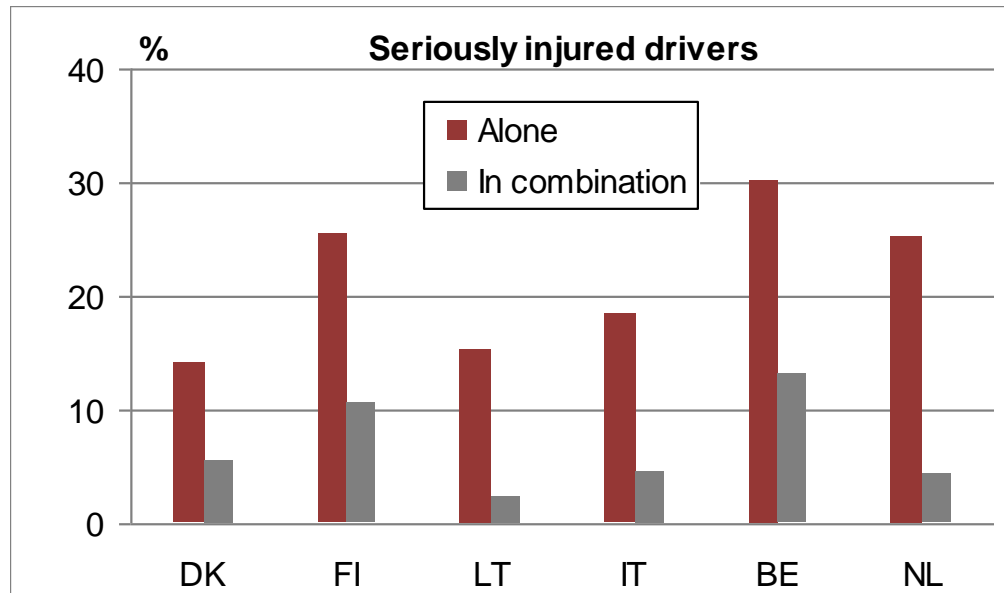
- Seriously injured drivers from BE, DK, FI, IT, LT and NL
- Killed drivers from FI, NO, PT and SE



Prevalence in injured and killed drivers



Alcohol



Among the alcohol positive drivers – both seriously injured and killed, the majority had a blood alcohol concentration equal to or above 0,5 g/L

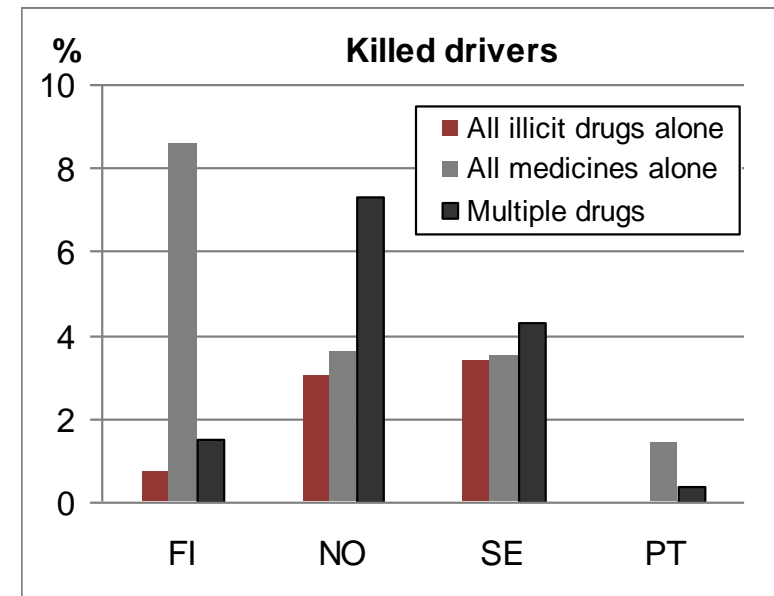
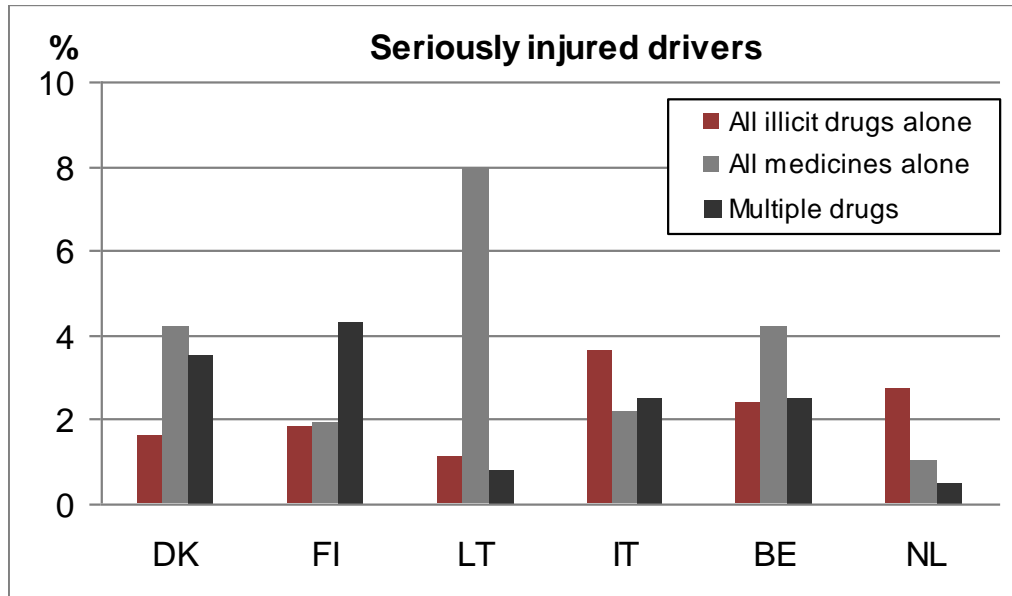
Combined use of alcohol and other drugs is considerable in a number of countries



Prevalence in injured and killed drivers



Illicit and medicinal drugs



For most illicit and medicinal drugs, the percentage of combined drug use exceeded that of single drug use



- **Risk of injury by driving with alcohol and other drugs**

Method:

Case-control study based on

- Data from seriously injured/killed drivers (cases)
- Data from road side surveys (controls)

Assessment of the risk for drivers of passenger cars and vans

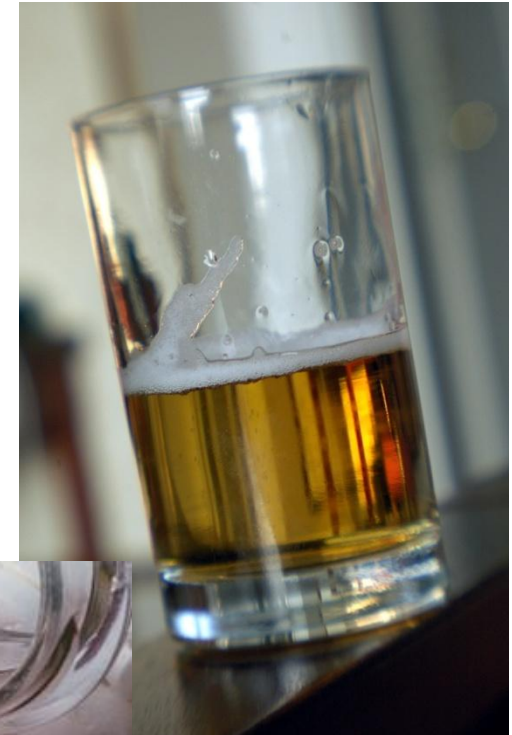
- Alcohol
- Illicit and medicinal drugs
- Alcohol combined with drugs
- Multiple drug use

Risk of serious injury

- BE, DK, FI, IT, LT and NL

Risk of fatality

- FI, NO, PT and SE

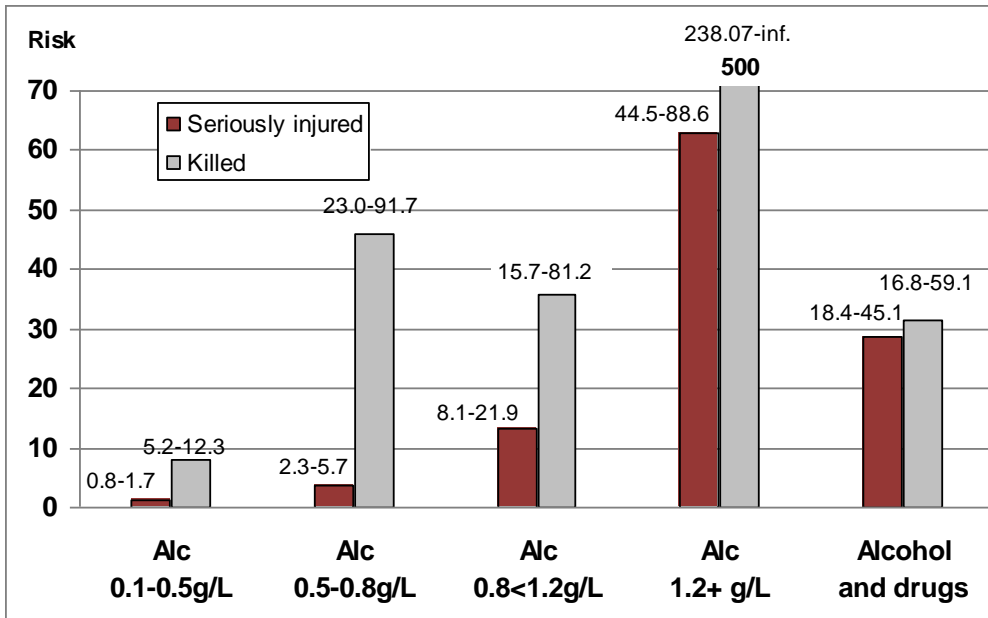




Inclusion criteria

- **Data from the population based case-control study**
 - Matched regions for control and case populations
- **If difference between case and control regions**
 - Extra control regions included
 - if no significant difference between age and gender in the not-matched regions compared to the matched regions
 - Extra case regions included
 - If no significant difference in injury score in the not-matched regions compared to the matched regions
- **Results**
 - Odds ratios calculated by means of logistic regression
 - Control study sample
 - Each subject was weighted by traffic volume in the time period
 - Adjustment for age and gender

Risk – results based on all countries

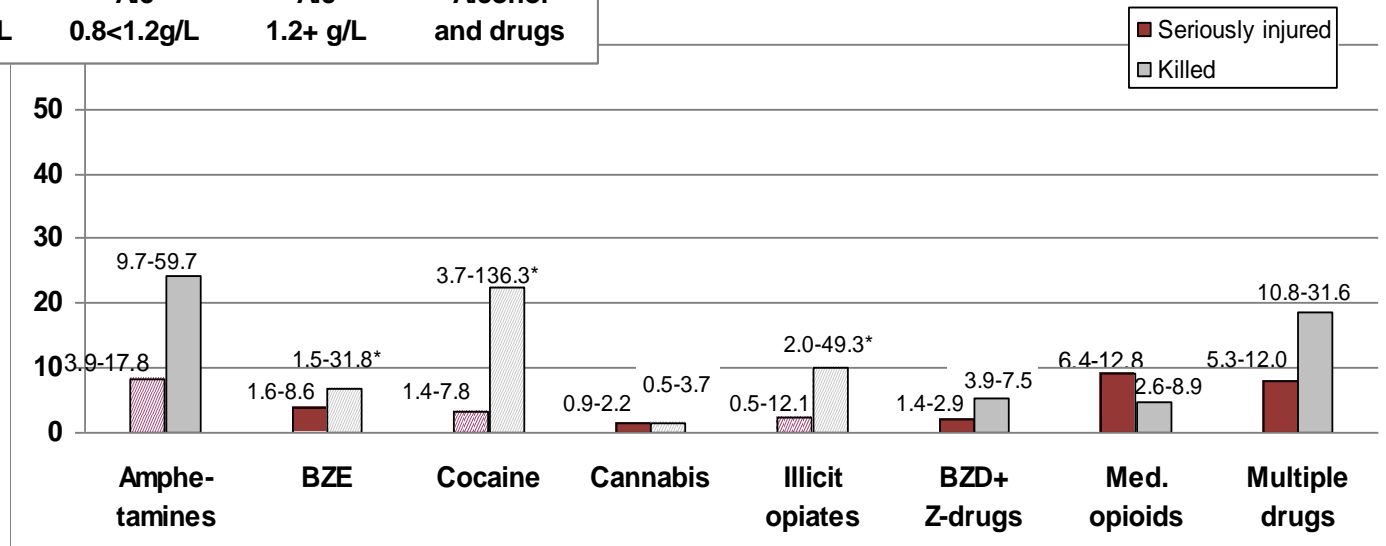


Risk when driving with alcohol

Odds ratios are adjusted for age and gender

Except * - crude odds ratios

Hatching - results must be handled with care



Risk when driving with illicit and medicinal drugs

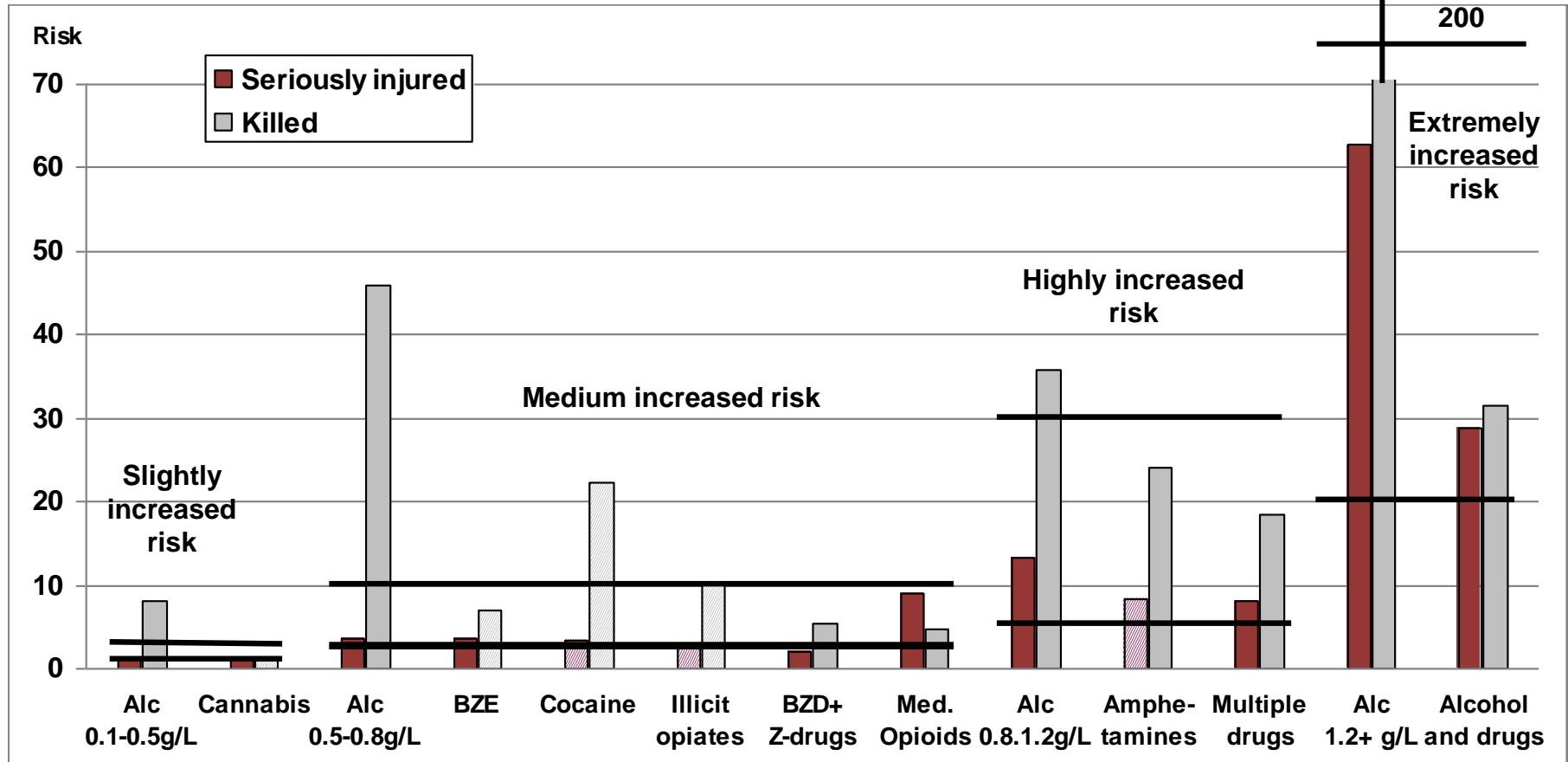


Risk – results based on all countries



Overall risk levels

Hatching - results must be handled with care





Thank you for your attention



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